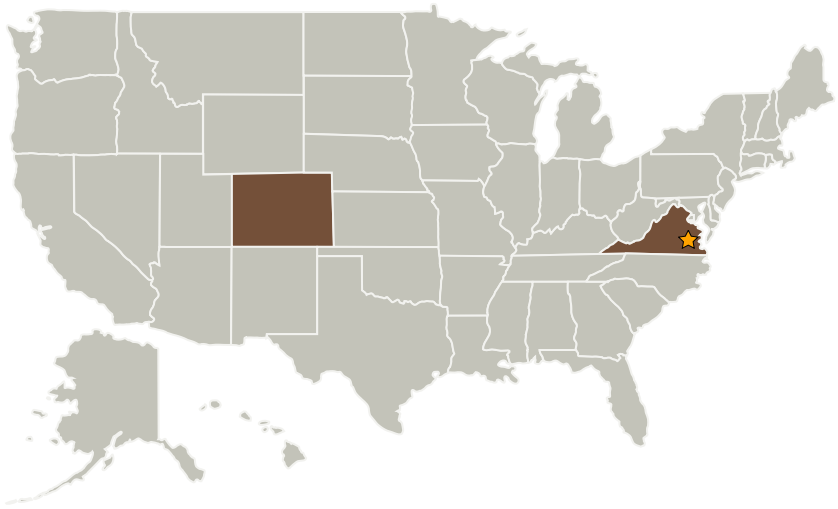
# Data Filtering and Assimilation of Satellite Derived Aerosol Optical Depth, Phase I

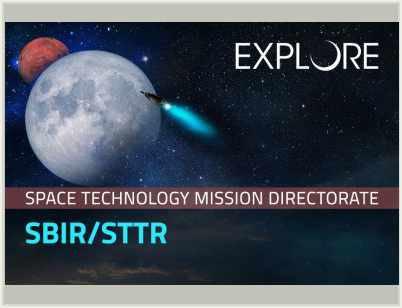
Completed Technology Project (2009 - 2009)

## Project Introduction

Satellite observations of the Earth often contain excessive noise and extensive data voids. Aerosol measurements, for instance, are obscured and contaminated by clouds, possible only on the sunlit side of the globe, and difficult over bright land areas. We propose to explore new filtering and data assimilation techniques for satellite derived aerosol optical depth based on the directional spherical wavelet transform. Initially we will focus specifically on aerosol measurements from the Moderate Resolution Imaging Spectroradiometer (MODIS) instruments flying on the Terra and Aqua satellites. In Phase I we will prototype a spherical wavelet filter and assess its ability to smooth aerosol fields and interpolate into data voids. The smoothed fields will be tested against surface network observations of aerosol optical depth. Further, we will build an interface to the Data Assimilation Research Testbed (DART) coupled to the Community Atmosphere Model (CAM) 4. Phase II will employ the wavelet filter and assimilation system to produce aerosol datasets for application in Earth radiation budget observations and atmospheric correction methods.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Langley Research Center (LaRC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

**Small Business Innovation Research/Small Business Tech Transfer**

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| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| ★Langley Research Center(LaRC) | Lead Organization | NASA Center | Hampton, Virginia |
| Tech-X Corporation | Supporting Organization | Industry | Boulder, Colorado |

| Primary U.S. Work Locations | |
|---|---|
| Colorado | Virginia |

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.4 Information Processing
    - TX11.4.1 Science, Engineering, and Mission Data Lifecycle